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HEALTH CARE QUALITY

How Does the United States Compare With Other Countries on Cancer Survival and Access to Bone Marrow Transplantation?

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Mr. Chairman and Members of the Subcommittee:

It is a pleasure to be here this morning to present our ongoing work on the quality of health care. Today I want to talk about the findings of two studies, each of which examines health care quality from an international, comparative perspective. The first compares survival for cancer patients in the United States and Ontario, while the second examines patterns across 10 countries in the use of allogeneic bone marrow transplantation in the treatment of leukemia.[1] Both studies focus on dimensions commonly associated with the quality of a health care system. The survival study compares outcomes for cancer patients, while the bone marrow study measures the availability and appropriateness of allogeneic bone marrow transplants. Let me first address the findings and implications for each study and then present our overall conclusions.

Outcomes: Cancer Survival in the U.S. and Ontario

Quality in health care has many components, but arguably the most important are the outcomes of medical interventions. International comparisons of health care outcomes have been sparse, with the most frequently cited data focused on infant mortality and average life expectancy. Although such comparisons are interesting and informative, the measures themselves can be influenced by many factors and, therefore, are not very direct indicators of the quality of health care. That is, they are determined not only by the health care delivery system but also by myriad social, environmental, and other factors, including population genetics, fertility patterns, and the prevalence of violence, to name but a few. That is why one of our studies focused on an outcome more directly dependent on the health care system--cancer patient survival. The question we set out to answer was whether there was any difference between the survival patterns for cancer patients in the United States and Canada.

We addressed this question by examining survival for four types of cancer: Hodgkin's disease, and breast, colon, and lung cancer. We selected these diseases so that we could include one cancer in which very few patients survive for more than a few years after diagnosis (lung cancer), one in which about half of the patients have the possibility of long-term survival (colon cancer), and a cancer in which most patients can be cured (Hodgkin's disease). Breast cancer was added to the group of

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[1]See U.S. General Accounting Office, Cancer Survival: An International Comparisons of Outcomes, GAO/PEMD-94-5 (Washington, D.C.: March 1994), and U.S. General Accounting Office, Bone Marrow Transplantation: International Comparisons of Availability and Appropriateness of Use, GAO/PEMD-94-10 (Washington, D.C.: March 1994).

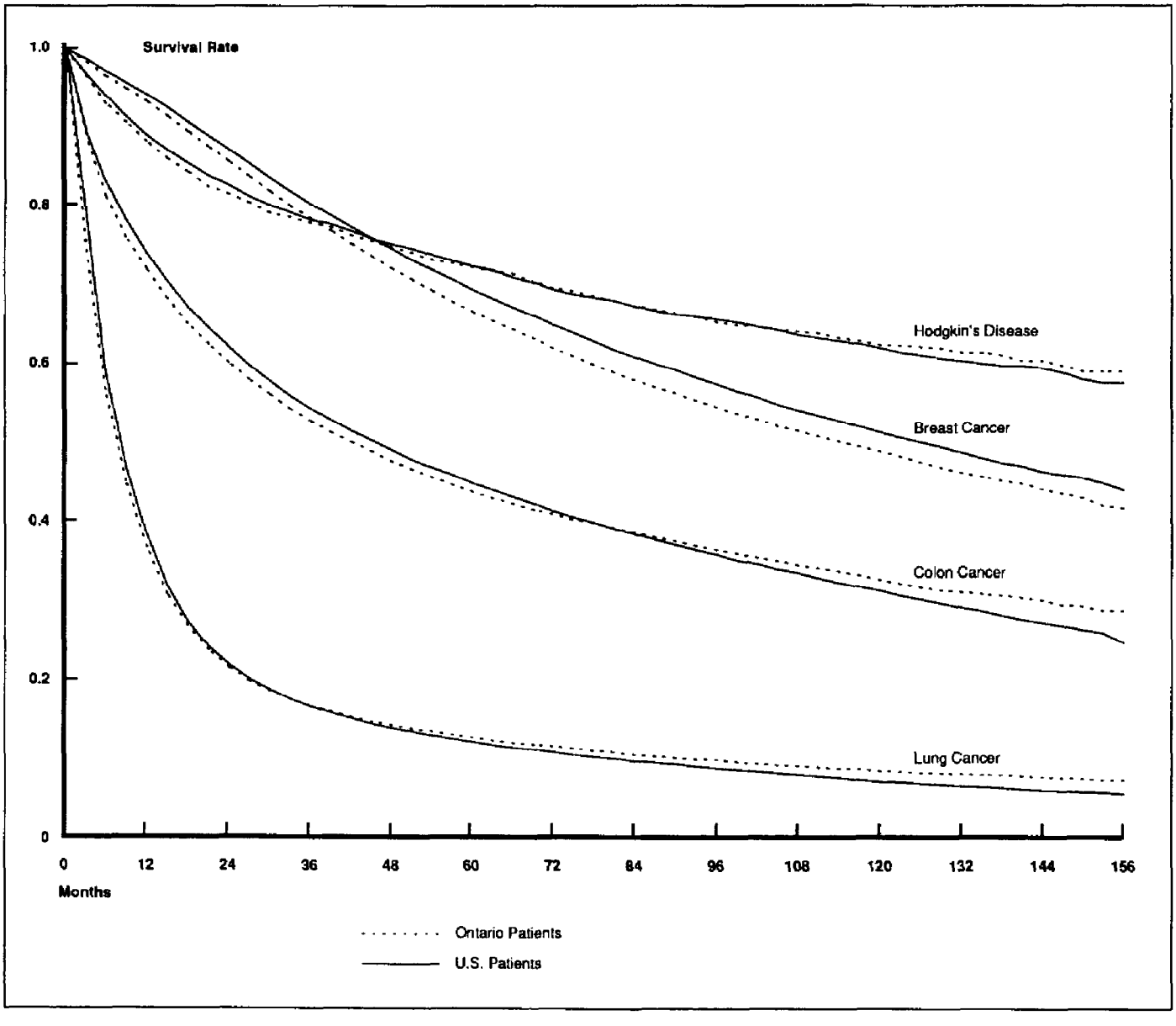
diseases because it is a condition that is both prevalent (in the United States, approximately 182,000 women were diagnosed with the disease in 1993) and of major public concern.

We compared the survival rates of large samples of patients from the United States and Canada. The U.S. patients were drawn from the data base maintained by the National Cancer Institute's Surveillance, Epidemiology, and End Results program. These data cover approximately 10 percent of the U.S. population and are drawn from a diverse set of geographic areas. Data on Canadian patients were provided by the Ontario Cancer Registry. Ontario accounts for approximately a third of Canada's population. However, because our report does not contain data on cancer patients from other provinces, the patterns we found are best characterized as those of Ontario rather than of the entire country.

Study Results

Our data included all patients diagnosed with any of the four types of cancer between 1978 and 1986. For each patient, we determined whether he or she was still alive at the end of 1990 (the last year for which data on patient follow-up were available) and, if not, the date of death. By cumulating across all the patients with each cancer, we generated a number of measures and statistics. Perhaps the most informative of these are the survival curves displayed in figure 1.

Figure 1: Cancer Survival in the United States and Ontario



What these curves show is the percentage of patients with each form of cancer in each country who remain alive at any specific time following diagnosis. For example, if we look at the colon cancer curve at 5 years, a slightly higher percentage of U.S. patients (1.2%) remain alive, whereas by 9 years a slightly greater percentage of the patients from Ontario remain alive (1.1%).

Even a cursory examination of the figure makes it clear that patients in the United States and Ontario share strikingly similar patterns of survival for the different types of cancer. That is, the two curves for each cancer are almost superimposed on each other. In addition, there was not much difference in the survival rates (the distance between the two curves at any single point) for any of the cancers. Thus, the answer to our question of what difference exists in survival between the United States and Ontario is, "not very much." Importantly, for each of the four cancers, this overall similarity in survival remained even after differences in patients' age, sex, and year of diagnosis were taken into account.

However, in addition to the similarity, there were some distinctions. First, a difference was observed between the patterns for breast cancer and the patterns for the three other diseases. As the figure shows, breast cancer patients in the United States experienced a slightly but consistently higher level of survival than Ontario's breast cancer patients throughout the follow-up period. In contrast, U.S. patients with each of the three other diseases demonstrated initially higher survival rates than their counterparts from Ontario (up to 1 or more years after diagnosis) followed by a loss of advantage occurring somewhere between 1 and 6 years. The result was that by 9 or 10 years, U.S. survival rates were slightly lower than the corresponding Ontario rates.

The differences in percentage of patients surviving were small for each cancer, but many were statistically significant, and the number of patients represented by these differences were sometimes substantial. For example, the 1.7 percent difference in lung cancer survival at 10 years after diagnosis corresponds to almost 17,000 additional U.S. patients who would have been alive 10 years after diagnosis if Ontario's survival (and general mortality) experience had applied in this country. Similarly, the 4.8 percent difference in breast cancer survival translates into about 45,000 more U.S. patients alive after 10 years than if we had experienced Ontario's survival rate.[2]

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[2]Both the 1.7 percent difference for lung cancer and the 4.8 percent difference for breast cancer are differences in relative survival. This measure controls for variation in overall life expectancy between the two countries.

Study Implications

It is not clear how to interpret the differences between the United States and Ontario, even those that show up as statistically significant (those for lung and breast cancers). One possible explanation is that quality of care for breast cancer patients is better in the United States than in Ontario and that for the three other cancers it is roughly equivalent or slightly better in Ontario. However, the differences might also result largely from variation in the way these cancers are detected in each country. Detection can influence survival in a number of ways. The earlier most cancers are detected, the more effectively they can be treated, thus improving survival. But earlier detection can also improve the measured survival time of a patient without improving actual survival. This phenomenon occurs because the earlier detection increases the observed survival time even when the date of death remains unchanged. In addition, aggressive detection practices can skew survival rate comparisons by increasing the percentage of patients with very slow growing tumors. In systems with more passive screening policies, these patients (who have a better-than-average prognosis) might never be incorporated into the survival data because their cancers were never detected. Until the effect on survival of possible variations in detection practices can be determined, the implications of any differences in measured survival for quality of care in the two locations will remain unclear.

Availability and Appropriateness: Bone Marrow Transplantation in Ten Countries

Because outcomes alone are not sufficient to assess quality, we undertook another study that was concerned primarily with comparisons between the United States and 9 other countries on two other important dimensions of quality in health care: availability and appropriateness. As I mentioned, this study focused on allogeneic bone marrow transplantation, a complex and expensive procedure used to treat leukemia and other hematologic disorders.[3] Our interest was in determining the extent to which patients in each country who needed transplants received them and how often transplants were performed at a point that optimized benefits while minimizing risks.

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[3]Allogeneic bone marrow transplants treat diseases of the bone marrow by destroying the diseased marrow of the patient and then infusing healthy marrow from a suitable donor. Patient charges for this procedure commonly exceed $125,000. The other major type of bone marrow transplant, which uses marrow drawn from the patient instead of a donor, is called an autologous transplant.

Allogeneic bone marrow transplants are recognized as a standard treatment option for patients with many different diseases but are most often used in the treatment of three types of leukemia: chronic myeloid leukemia (CML), acute lymphoid leukemia (ALL), and acute myeloid leukemia (AML). Our focus was on these three diseases. Although a transplant sometimes offers the only chance of cure for patients with these diseases, it can also lead to serious complications and sometimes to death. Therefore, its use requires a careful weighing of the potential benefit and harm to the patient.

In order to compare the availability and appropriateness of this treatment across health systems, we obtained both incidence data for leukemia and the most recently available data on all allogeneic transplants conducted in Australia, Canada, Denmark, France, Germany, the Netherlands, New Zealand, Sweden, the United Kingdom, and the United States. The data on transplants came from the 208 centers that performed them during 1989-91 and covered approximately 10,000 patients. In addition, we convened an advisory panel of clinical experts in the field of bone marrow transplants to establish criteria for what would constitute better quality along both dimensions of interest to the study. Finally, we interviewed heads of transplant units in each of the countries to gain some insight into the environments in which decisions regarding transplantation were made.

Study Results

Our findings on the availability of transplants are displayed in table 1. Two sets of findings are presented. The first column shows the overall rate as computed by dividing the total number of transplants by the number of people in each country in the age group generally eligible for transplantation.[4] The last column of the table shows the likelihood that patients with chronic myeloid leukemia in each country would receive a transplant. Our focus on CML as the "signal" disease for the availability dimension is based on the fact that it is the one relatively common form of leukemia that can be cured only with transplantation (ALL and AML are sometimes cured by chemotherapy). The rates for CML were computed by dividing the number of transplants for CML in each country by the incidence of the disease for that country.

[4]Patients age 55 and older were generally not considered to be suitable candidates for bone marrow transplants because the complications that often accompany the treatment become more severe with age.

Table 1: Availability of Transplants: Annual Rates of Allogeneic Bone Marrow Transplantation, 1989-91

Country	Per million population (age 0-54)	Per case of CML (age 0-54)
Sweden	9.0	.54
United Kingdom	8.2	.48
New Zealand	7.4	.46
Denmark	7.8	.41
Canada	8.9	.39
Australia	8.8	.38
United States	8.1	.35
Netherlands	6.6	.33
France	13.4	.32
Germany	5.6	.26

As can be seen from the table, the United States, with a rate of 8.1 transplants per million, was near the middle of the 10 countries on the overall availability of transplantation. The same was true for CML, for which the United States was seventh. That is, for a disease in which a bone marrow transplant is the only therapy with curative potential, patients in the United States were less likely to receive a transplant than were patients with that disease in 6 other countries.

Our findings on appropriateness are presented in table 2. The numbers displayed in each column show, for each country, the percentage of patients who received a transplant at a less-than-optimal point in the progress of their leukemia. (For example, the upper lefthand cell shows that 18 percent of the CML patients who received a transplant in the Netherlands would have had a better prognosis had they received their transplants earlier.) The data are presented separately for each disease because the criteria used to define "advanced disease" differ for each leukemia. The last column shows the proportion of transplants in each country (for any of the three diseases) that were performed at a less appropriate stage.

Table 2: Appropriateness of Transplantation: Proportion of Allogeneic Bone Marrow Transplants Performed at Advanced Stage of Disease[a]

Country	CML	ALL	AML	Total
Netherlands	18%	9%	4%	10%
United Kingdom	22	6	1	11
Canada	21	5	2	11
France	35	1	3	12
Sweden	22	8	6	14
Denmark	30	0	0	17
Germany	27	19	6	17
Australia	33	21	2	19
United States	30	20	7	19
New Zealand	50	50	0	31

[a]For related-donor transplants performed in 1989-91.

In general, the appropriateness data show that patients in the United States were among those least likely to receive their transplants at the most appropriate point in the progression of their disease. Although this pattern has negative implications for the quality of care for each of the leukemias, this is especially true for CML patients. In the case of CML, because the overall rate of transplantation was not particularly high in the United States, the relatively large percentage of transplants performed on patients with poor prognosis means that relatively fewer patients with good prognosis received transplants in this country than elsewhere.

In addition to patients with advanced disease who might have benefited more from transplantation had they received the treatment earlier, we identified a group of patients who may have received transplants that were not necessary. Specifically, as the time in first remission increases for acute lymphoid leukemia patients who have been treated with chemotherapy, the likelihood that they have been cured by the conventional therapy increases. Therefore, after a certain point, the risks entailed in undergoing bone marrow transplantation will exceed its likely benefits for this group of patients. However, one quarter of the ALL patients in the U.S. who received their transplants in first remission waited more than a year for their transplants. In all likelihood, a bone marrow transplant was not necessary for many of these patients.

Conclusions

Our comparison of cancer survival rates in the United States and Ontario tells a very simple story. Survival for the four types of cancer is very similar in both locations. With different diagnoses or at different time points, one or the other system shows a slight advantage. However, the overall pattern is one of similarity, with minor variations and, where differences do exist, they have ambiguous implications for assessing quality. We conclude, therefore, that whatever the differences in the structure and financing of the U.S. and Canadian health care systems, they do not produce any clear differentiation in patient survival for these four types of cancer.

Our findings on the availability of allogeneic bone marrow transplantation convey a similar message. Of course, they apply specifically to the use of this procedure in the management of three diseases. However, our "bottom line", that the United States is not notably different from numerous other industrialized countries in the provision of this "high-tech" treatment does have a larger implication in that it raises questions about two prevalent views of health care quality in the United States. Both views, that high quality is achieved through an abundance of high-technology medicine or that the overuse of medical technology detracts from quality by exposing patients to unnecessary risks, rest on a common assumption: that the United States relies on the newest and most complex treatments more than do other economically advanced countries. The findings in our study challenge that assumption. The patterns that we observed demonstrate that U.S. patients, for good or ill, have not been the most likely to receive a transplant for any of the clinical conditions examined.

I believe the most important of our findings concern appropriateness, where the data indicate that even those leukemia patients in the United States who gain access to transplants are less likely than patients in many other countries to receive care at the time when they are most likely to benefit from it. Specifically, the relative standing of the United States on the dimension of appropriateness shows that we, to a greater extent than elsewhere, have failed to provide transplants to patients before their disease progressed to a less treatable stage. At the same time, other U.S. patients were exposed to the risks associated with bone marrow transplantation when the likelihood that their leukemia would relapse was already very low.

The data we have presented today do not allow us to determine which among the proposals developed to date for reform of our health care system is likely to improve the performance of the United States in the area of transplant services. Our data do highlight specific areas where patterns of bone marrow transplantation in the management of the three leukemias could be

improved. They also show that, for the diseases and therapy examined, a range of alternative approaches to financing and delivering health care perform as well or better along three dimensions of quality than our existing health care system.

This concludes my remarks. I would be happy to answer any questions that you might have.

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